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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/656,793   | 09/05/2003  | Eric Soenen          | 4363P015            | 7097             |
| 8791   | 7590        | 06/30/2004           | EXAMINER            |                  |
| BLAKELY SOKOLOFF TAYLOR & ZAFMAN<br>12400 WILSHIRE BOULEVARD, SEVENTH FLOOR<br>LOS ANGELES, CA 90025 |             |                      | QUINTO, KEVIN V     |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2826                |                  |

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/656,793

Applicant(s)

SOENEN ET AL.

Examiner

Kevin Quinto

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-19 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 8 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 8 recites the limitation "said metal layer" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.
4. Claim 8 recites the limitation "said lower metal layer" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.
5. The examiner is unable to determine what "said metal layer" is referring to since several metal levels have been described in the claims upon which claim 8 is dependent (claims 1, 3, 4, 5, 6).
6. The examiner is unable to determine what "said lower metal layer" is referring to since several metal levels have been described in the claims upon which claim 9 is dependent (claims 1, 3, 4, 5, 6).

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 2, and 10-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Hu et al. (USPN 6,743,671 B2).

9. In reference to claims 1 and 19, Hu et al. (USPN 6,743,671 B1, hereinafter referred to as the "Hu" reference) discloses a similar device. In figures 4 and 5 (top view and cross-section) illustrate a capacitor with an inner node (42a, 42b, 42c, 42d) comprising a first pair of vertically aligned strips (421d with 421c or 421c with 421b or 421b with 421a) electrically connected with one or more vias (422c or 422b or 422a). Likewise there is a second pair of vertically aligned strips (421d with 421c or 421c with 421b or 421b with 421a) which can be any other of the vertical sections (42), shown in figure 5, which are electrically connected with one or more vias (422c or 422b or 422a). The higher strips of both of said pairs are at a same metal level while the lower strips of both of said pairs are at a same lower metal level. In figure 5, the lower metal level can be any metal level which is lower than the highest metal level (421d). In figures 4 and 5, there is an outer node with a first metal structure (411d) at the said metal level. The first metal structure (411d) has a pair of windows. A first of said windows surrounds but is isolated from a first of said higher strips. A second of said windows surrounds but is isolated from a second of said higher strips. At the said lower metal level, a second metal structure (411c or 411b or 411a) has a pair of windows. A first of said windows

surrounds but is isolated from a first of said higher strips. A second of said windows surrounds but is isolated from a second of said higher strips. The first and second metal structures are electrically connected with one or more vias (412c, 412b, 412a, 422c, 422b, 422a). With regard to claim 19, the process used to fabricate the device of Hu (including the use of a computing system to execute instructions on a machine readable medium) inherently meets the claim.

10. In reference to claim 2, figure 5 of Hu shows that the lower metal level can be the second metal level (411b, 421b) of the semiconductor device while the higher metal level can be the third metal level (411c, 421c).

11. With regard to claim 10, Hu discloses that the capacitor is intended for use in an analog-to-digital converter circuit (column 1, lines 11-15).

12. In reference to claim 11, Hu (USPN 6,743,671 B1) discloses a similar apparatus. In figures 4 and 5 (top view and cross-section) illustrate a capacitor with an outer metal feature (411d or 411c or 411b or 411a) that forms a window which completely surrounds and is isolated from an inner, rectangular metal strip (421d or 421c or 421b or 421a), which runs along a width of the capacitor. The outer metal feature (41) and the rectangular metal strip (42) are on the same metal level.

13. With regard to claim 12, figures 4 and 5 of Hu show that the outer metal feature (411d or 411c or 411b or 411a) forms a second window which completely surrounds and is isolated from a second, inner, rectangular metal strip (421d or 421c or 421b or 421a) which runs along a width of the capacitor.

14. In reference to claim 13, figure 5 shows that a second metal feature (411d or 411c or 411b or 411a), at another level and vertically aligned with the outer metal feature (411d or 411c or 411b or 411a), is connected to the outer metal feature (411d or 411c or 411b or 411a) with one or more vias (412c or 412b or 412a).

15. With regard to claim 14, figure 5 shows that a third metal feature (421d or 421c or 421b or 421a), at another level and vertically aligned with the rectangular metal strip (421d or 421c or 421b or 421a), is connected to the rectangular metal feature (421d or 421c or 421b or 421a) with one or more vias (422c or 422b or 422a).

16. In reference to claims 15-17, figures 4 and 5 of Hu show a second outer metal feature (411d or 411c or 411b or 411a) that forms a second window which completely surrounds and is isolated from a second, inner, rectangular metal strip (421d or 421c or 421b or 421a) which runs along a width of the capacitor. The second outer metal feature (411d or 411c or 411b or 411a), at another level and vertically aligned with the outer metal feature (411d or 411c or 411b or 411a), is electrically connected to the outer metal feature (411d or 411c or 411b or 411a) with one or more metal vias (412c or 412b or 412a). The inner rectangular metal strip (421d or 421c or 421b or 421a) is vertically aligned with the second rectangular metal strip (421d or 421c or 421b or 421a), is connected to the inner rectangular metal strip (421d or 421c or 421b or 421a) with one or more metal vias (422c or 422b or 422a).

17. With regard to claim 18, Hu discloses that the capacitor is intended for use in an analog-to-digital converter circuit (column 1, lines 11-15).

***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al. (USPN 6,743,671 B1) in view of Paul et al. (USPN 6,737,698 B1).

20. In reference to claims 3, 4, 5, and 6, Hu does not disclose shielding the capacitor. However the use of shielding for capacitors is well known in the art. Paul et al. (USPN 6,737,698 B1, hereinafter referred to as the "Paul" reference) discloses the use of shielding for capacitors in figures 4-13. The shielding is vertically aligned with the capacitor structure and is connected to the outer node (figure 8). Paul makes it clear that the shielding connected to the outer node may be connected to a top or bottom shield (column 4, lines 31-37). The shielding provides the benefit of confining electric fields between the nodes (column 2, lines 44-46) in order to avoid a reduction in the quality factor of the capacitor (column 1, lines 54-57). Paul discloses that a higher quality factor for a capacitor is a desirable goal in the art (column 1, lines 16-19). In view of Paul, it would therefore be obvious to utilize vertically aligned shielding in the Hu device in order to avoid a reduction in the quality factor of the capacitor. With regard to claims 4 and 6, Hu and Paul teach all of the claimed invention except for the strip shape of the shielding layer. Although Hu and Paul do not teach the exact strip shape of the shielding layer as that claimed by Applicant:

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The shape, size, dimension differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416.

Therefore claims 4 and 6 are not patentably distinguishable over the Hu reference.

### ***Allowable Subject Matter***

21. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. The following is a statement of reasons for the indication of allowable subject matter: the examiner is unaware of any prior art which suggests a semiconductor device with a capacitor having an electrode made of concentric metal layers formed on multiple levels each of which surround another electrode such that it includes shielding isolated from a bus.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quinto whose telephone number is (571) 272-1920. The examiner can normally be reached on M-F 8AM-5PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KVQ

  
**Minhloan Tran**  
**Primary Examiner**  
**Art Unit 2826**